

# Plant Biology A: Gene Function and Regulation (56.0)

## **Program Goals**

- To obtain a detailed understanding of the function of agriculturally important genes and the regulation of gene expression in agricultural plants to better use these genes for improved crop production and quality

# Plant Biology A: Gene Function and Regulation (56.0)

## **Program Priorities for FY 2008**

Research priorities:

1. Functional analyses of agricultural important genes in plants, including development of improved mutational or gene silencing approaches
2. Regulatory mechanisms of gene expression (systems level studies encouraged)

# Plant Biology A: Gene Function and Regulation (56.0)

Significant changes for FY 2008:

The genetic diversity integrated priority has been moved to Plant Biology E: Plant Breeding and Education.

For the disease/pest resistance gene aspect of Research Priority 1, the program will focus on different pathogen/pest groups on a rotational basis. For FY 2008: fungi, oomycetes, bacteria and virus, not arthropods or nematodes.

Program will no longer accept proposals solely using non-agricultural model species.

# Plant Biology A: Gene Function and Regulation (56.0)

## **Program Statistics – FY 2007**

- # of Proposals Submitted: 80
- # of Proposals Awarded: total 16 (standard research 8, AREA 4, conferences 2, integrated 2)
- % Success: 13% research; 25% integrated
- Average Award Size: \$360,000 research (not counting conferences, postdoc, seed & sabbatical grants); \$500,000 integrated
- Average Award Duration: 2.85 years

# **Plant Biology B: Environmental Stress (56.0)**

## **Program Goals**

- Increase fundamental knowledge of genetic, genomic, molecular, physiological, ecophysiological, and biochemical components involved in plant abiotic stress response and adaptation
- Develop approaches and tools to aid agricultural plant productivity in response to reduced inputs or increased environmental stresses
- Develop, through biotechnology and/or breeding, new plant lines or populations for improved abiotic stress-resistance or tolerance in agricultural plants

# **Plant Biology B: Environmental Stress (56.0)**

## **Program Priorities for FY2008 Research**

Identify and characterize genes, proteins, processes, and/or networks pathways contributing to abiotic stress tolerance in the research priority areas of:

- Water stress
- Global change
- Temperature stress

# **Plant Biology B: Environmental Stress (56.0)**

## **Significant Changes for FY2008**

- Integrated plant breeding priority now in Plant Biology E: Plant Breeding and Education
- Starting in FY2009, proposals in priority areas of Global Change, Nutrient Stress, and Temperature Stress will be solicited on a rotating basis. The anticipated priority rotation schedule is:
  - FY 2009: Global Change & Nutrient Stress
  - FY 2010: Nutrient Stress & Temperature Stress
  - FY 2011: Temperature Stress & Global Change
- The program will no longer accept proposals solely using non-agricultural model species.

# **Plant Biology B: Environmental Stress (56.0)**

## **Program Statistics – FY 2007**

- # of Proposals Submitted: 62
- # of Awards: 14 (including conferences, AREA awards)
- % Success: 22.5% overall; 22% standard grants
- Average Award Size: \$330,000 (not including conferences, postdoc, equipment, integrated)
- Average Award Duration: 2.9 years



# **Plant Biology C: Biochemistry (56.0)**

## **Program Goals**

- Increase fundamental knowledge of biochemical pathways, processes, and mechanisms for improved utilization of genomics in agricultural plants
- Use plant biochemistry to enhance plant production, efficiency, protection, quality, and use
- Create improved agricultural plant lines or populations through use of basic biochemical knowledge and biotechnology
- Develop model agricultural species for biochemical studies

# **Plant Biology C: Biochemistry (56.0)**

## **Program Priorities for FY2008 Research**

- Primary and secondary metabolism
- Plant cell wall structure, formation, and modification
- Photosynthesis and respiration

# **Plant Biology C: Biochemistry (56.0)**

## **Significant Changes for FY2008**

- Starting in FY2009, proposals in priority areas of Plant Cell Walls, Photosynthesis/Respiration, and Nitrogen Fixation will be solicited on a rotating basis. The anticipated priority rotation schedule is:
  - FY 2009: Plant Cell Wall and Nitrogen Fixation
  - FY 2010: Nitrogen Fixation and Photosynthesis/Respiration
  - FY 2011: Photosynthesis/Respiration and Plant Cell Wall

# **Plant Biology C: Biochemistry (56.0)**

## **Program Statistics – FY 2007**

- # of Proposals Submitted: 71
- # of Awards: 16 (including conferences, AREA awards)
- % Success: 22.5% overall; 18% standard grants
- Average Award Size: \$378,000 (not including conferences, postdoc, equipment)
- Average Award Duration: 3.0 years

# Plant Biology D: Growth and Development (56.0)

## **Program Goals**

- To develop crop models for studying plant developmental processes
- To provide detailed understanding of signal transduction mechanisms to improve performance of agricultural plants
- To enhance the ability to alter developmental processes of agricultural plants to improve plant characteristics

# Plant Biology D: Growth and Development (56.0)

## **Research Priorities for FY 2008**

- Developmental pathways leading to the formation of vegetative or reproductive structures
- Hormonal regulation of growth and development; cross-talk between signaling pathways using metabolomic tools is encouraged
- Characterization of cellular structures and processes crucial for plant development

# Plant Biology D: Growth and Development (56.0)

Significant changes for FY 2008:

- For Research Priority 3, the program will focus on different cell biological processes on a rotational basis. For FY 2008, the focus is cytoskeleton and membrane transport.
- Program will no longer accept proposals solely using non-agricultural model species.

# Plant Biology D: Growth and Development (56.0)

## Program Statistics – FY 2007

- # of Proposals Submitted: 79
- # of Proposals Awarded: total 14 (standard research 9, conferences 2, AREA awards 3)
- % Success: 17.7% overall; 16% standard grants
- Average Award Size: \$369,725 (not counting conferences, postdoc)
- Average Award Duration: 2.92 years



# **Plant Biology E: Plant Breeding and Education (56.0)**

## **Program Goals**

- To increase the number of students and scientists trained in plant breeding and in careers requiring plant breeding expertise
- To improve transfer of science-based knowledge to producers and consumers through breeding or breeding combined with biotechnology

# **Plant Biology E: Plant Breeding and Education (56.0)**

## **Program Priorities for FY 2008 Integrated**

- Education and training in an academic setting to build expertise in plant breeding combined with research focusing on germplasm enhancement for abiotic environmental stress tolerance, with particular emphasis on drought tolerance.
- Education and training in an academic setting to build expertise in plant breeding combined with research focusing on germplasm enhancement for improved nutrient uptake and/or utilization, with particular emphasis on nitrogen.

# **Plant Biology E: Plant Breeding and Education (56.0)**

## **Significant changes for FY 2008:**

- New program element, formed by combining integrated plant breeding research-education priorities from Plant Biology A (Gene Expression and Genetic Diversity) and Plant Biology B (Environmental Stress)

# **Plant Biology E: Plant Breeding and Education (56.0)**

## **Program Statistics – FY 2007**

- New program element. Did not exist as separate element in FY 2007.
- Success rate:
  - 25% for 56.0A integrated proposals
  - 20% for 56.0B integrated proposals
- Average award size \$480,000

# NRI Plant Genome (52.1)

## Goals / Priorities

- Research
  - *Plant Genome (A): Tools, Resources and Bioinformatics, and Plant Genome (B): Functional Genomics*
    - (A) Genome-wide approaches for mapping and identification of important genes, MAS, QTL analysis, comparative genomics, bioinformatics, and (B) Increase the understanding of the biological role of genomic sequences. Both Focus on agriculturally significant plant families (*Rosaceae* and *Compositae* in FY 2008). Next year (FY 2009), the focus will be *Poaceae* and *Fabaceae*.
  - *Plant Genome (C): Genome Structure and Organization*
    - Develop or improve the physical map of the Genome of hexaploid wheat.
- Integrated (*Plant Genome (D): CAP*)
  - Application of genome-wide discoveries and technologies for U.S. crop or forestry improvement.

# Changes For FY 2008

- Research Program elements *52.1A – Tools, Resources and Bioinformatics* and; *52.1B – Functional Genomics*, will focus on agriculturally important specialty crops in Rosaceae and Compositae (was Solanaceae in FY 2007)
- Research Program element *52.1C – Genome Structure and Organization* will focus on Wheat (not offered in FY 2007)
- Integrated Program element *52.1D – Applied Plant Genomics Coordinated Agricultural Project (CAP)* will be offered, is open to ALL applicants and is NOT plant species specific; Letter of intent is REQUIRED (due date November 26, 2007); Only PD's that receive notification encouraging a submission can submit a CAP application (was also open to all plant species in FY 2007 and funded conifer project)
- Applications due February 14, 2008.

# Funding Statistics

## FY 2007

	<b>Tools, Resources and Bioinformatics AND Functional Genomics</b>	<b>Integrated Applied Genomics CAP</b>
<b>No. of proposals submitted</b>	38	4
<b>No. of proposals awarded</b>	Research - 12 Strengthening - 1 Conferences - 4	1
<b>% Success</b>	Research - 35 Strengthening – 17 Conferences – 100	25
<b>Average Award Size (\$)</b>	388K	6M (5M - NRI and 1M - Forest Service)
<b>Average Duration (Years)</b>	2.5	4

# Plant Genome

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